

CC 2/1/2020

LD 2/1/2020

AR 2/1/21

Attachment II

Causal Analysis Report

Chevron Richmond Refinery
Reportable Flaring Events

November 3-8, 2020

Flaring Due to Hydrogen Plant Start-up Following Power Outage

Refinery Flare Event – Cause Investigation Report

1. Date on which the report was drafted: January 27, 2021

2. The refinery name and site number:

Refinery: Chevron Richmond Refinery

Refinery Site Number: A0010

3. The assigned refinery contact name and phone number:

Contact Name: Brandon Sutter

Contact Phone Number: (925) 394-8773

Is this a rescission/modification of a previous report: No.

Date of initial report: N/A

Reason for rescission/modification: N/A

4. Identification of flare (s) at which the reportable event occurred by reviewing water seal monitoring data to determine which seals were breached during the event

Flare	Reportable Event (SO ₂ or Vent Gas Volume)
H2 (S-6021)	Vent Gas Volume

5. The flaring event duration for each affected flare

Flare (Source Number): H2 (S-6021)

The Date(s) of the event: 11/3/2020-11/5/2020 and 11/8/2020

The start time of the event: 11/3/2020 08:12 AM

The end time of the event: 11/8/2020 11:59 PM

The net duration of event (in hours and minutes): 3 days, 15 hours, 47 minutes

6. A brief description of the flaring event –

On November 3, 2020, the Chevron Richmond Refinery began start-up of Hydrogen Plant Trains 1 and 2 following the power outage discussed in Attachment I. The Hydrogen plant start-up procedures include routing flows to relief. The Hydrogen Plant does not have any flare gas recovery or a water seal, and therefore all relief flows result in flaring. The vent gas volume exceeded 500,000 SCF on November 3-5 and November 8, 2020.

7. A process flow diagram showing the equipment and process units that were the primary cause of the event.

See Attachment IIa.

8. The total volume of vent gas flared (MMSCF) throughout the event

Flare	Volume (MMSCF)
H2	20.2

9. The emissions associated with the flaring event per calendar day

Flare	Calendar Day	CH4 (lbs.)	NMHC (lbs.)	SO2 (lbs.)
H2	November 3, 2020	1,110	53	0
H2	November 4, 2020	145	31	0
H2	November 5, 2020	2,118	71	0
H2	November 8, 2020	122	18	0

Assumptions used to calculate some of the emissions – consistent with the reporting under Reg. 12-11.

10. A statement as to whether or not the gas was scrubbed to eliminate or reduce any entrained compounds and a list of the compounds for which the scrubbing was performed.

The vent gas was not scrubbed to eliminate or reduce any entrained compounds.

11. The primary cause of the flaring event including a detailed description of the cause and all contributing factors. Also identify the upstream process units that contributed vent Gas flow to the flare header and provide other flow instrumentation data where available.

Root cause: Procedures are designed to adhere to unit and flare system design.

The main contributor of vent gas flow during this event originated from Hydrogen Plant Units Train 1, Train 2, and PSA units.

12. Describe all immediate corrective actions to stabilize the flaring event, and to reduce or eliminate emissions (flare gas recovered or stored to minimize flaring during the event). If a decision was made not to store or recover flare gas, explain why.

Operations proceeded with the start-up activities per the procedure in a timely fashion to eliminate the emissions. The Hydrogen Plant does not have flare gas recovery.

13. Was the flaring the results of an emergency? If so, was the flaring necessary to prevent an accident, hazard or release to the atmosphere?

Flaring was not due to an Emergency (defined in Regulation 12-12-201) as interpreted by the BAAQMD.

14. If not the result of an emergency and necessary to prevent an accident, hazard or release to the atmosphere, was the flaring consistent with an approved FMP? If yes, provide a citation to the facility's FMP and any explanation necessary to understand the basis for this determination.

Flaring was consistent with Chevron's FMP Section 2.1 Table 2-4. Table 2-4 identifies PSA1 (S-4449) and PSA2 (S-4450) as sources that could be flared in non-emergency situations (e.g. start-up, shut-down).

15. If the flaring was due to a regulatory mandate to vent to flare, why couldn't the gas be recovered, treated, and used as fuel gas?

N/A. Flaring was not due to regulatory mandate.

16. Identify and describe in detail each prevention measure (PM) considered to minimize flaring from the type of reportable flaring event that occurred.

- State whether the PM is feasible (and will be implemented), or not feasible
- Explain why the PM is not feasible, if applicable

Flaring cannot be prevented during plant start-up due to facility and relief system design. Operational activities were consistent with start-up procedures.

Signature: *Linda Duca*

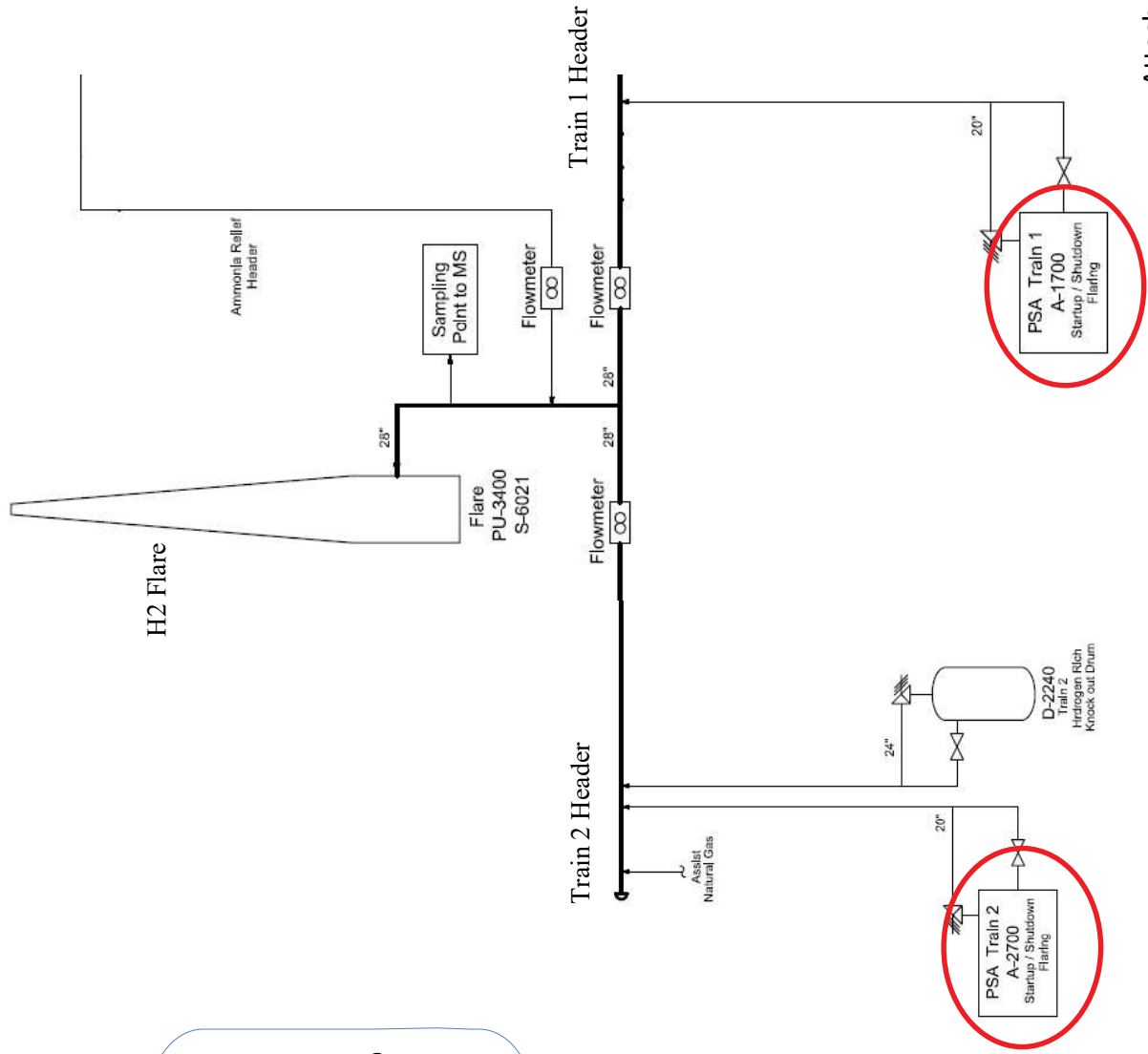
Email: lduca@baaqmd.gov

Signature: *Alme Rosquites*
Alme Rosquites (Feb 1, 2021 14:44 PST)

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Flaring Due to Hydrogen Plant Start-up

Following the power outage on November 2, 2020 Hydrogen Plant start-up began on November 3, 2020 and continued through November 8, 2020. Start-up procedures include routing flows to relief and the Hydrogen Plant flare does not have a water seal or flare gas recovery.



Attachment IIa

Chevron Richmond Refinery